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AN ELEVENTH CENTURY REFECTORY IN THE CELLAR OF THE NEW RESIDENCE FOR GEORGE MARSHALL ALLEN, MORRISTOWN, N. J.

A Very Early English Room

Chas. I. Berg, Architect

THE use of any portion of the cellar of a country house for master's rooms, is something of a novelty, and the reproduction of an Eleventh Century refectory therein is decidedly unique. In studying English Manor houses, the subterranean rooms of Welbeck Abbey, the residence of the Duke of Portland, suggested the scheme for use in the residence of Mr. George Marshall Allen, near Morristown, N. J.

At the request of Mr. Allen, Mr. Charles I. Berg, the architect of the house, has embodied several motifs that appear in Compton Wynyates, one of the country seats of the Marquis of Northampton.

While the design is in no way a copy of the original house, both the exterior and the interior include many of those features which make it one of the most beautiful in all England.

Compton Wynyates was built prior to 1520, but from that time on, additions and alterations were made, principally during the reign of Henry the Eighth, which embellished it, and added to the original structure that peculiar charm of English residences which comes from additions at various periods.

In Mr. Berg's design, it has been the intention to create

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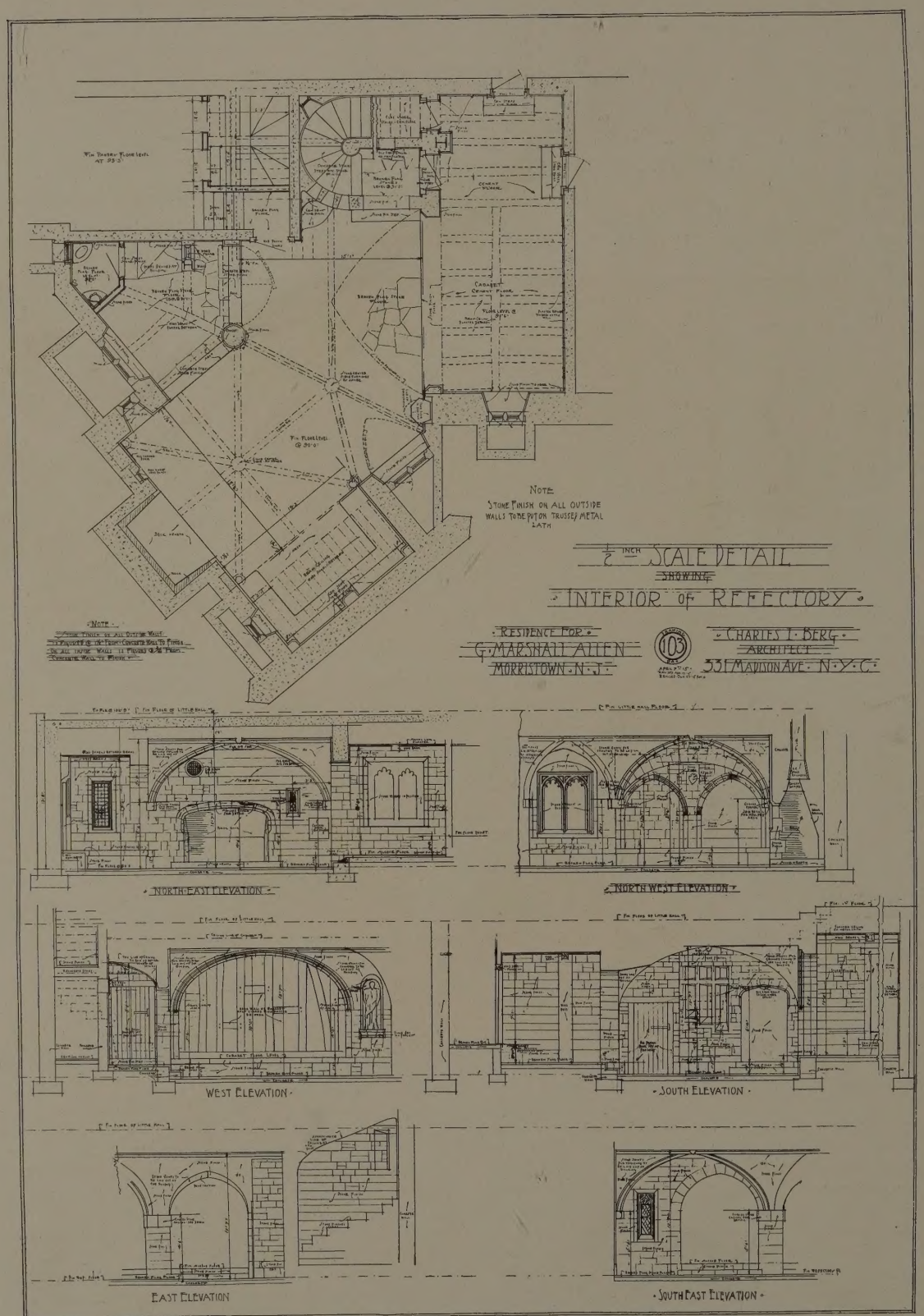

NOTE
STONE FINISH ON ALL OUTSIDE WALLS TO BE PITON TRUSSED METAL LATH
½ INCH SCALE DETAIL
SHOWING
INTERIOR OF REFECTORY
RESIDENCE FOR
G. MARSHALL ALLEN
MORRISTOWN N.J.
CHARLES I. BERG
ARCHITECT
331 MADISON AVE. N.Y.C.
NORTH EAST ELEVATION
NORTH WEST ELEVATION
WEST ELEVATION
SOUTH ELEVATION
EAST ELEVATION
SOUTH EAST ELEVATION

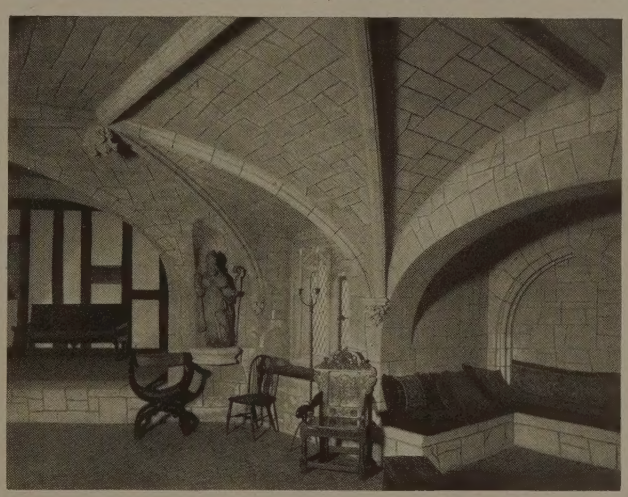
(*Continued from page 95*)

the effect of an aggregation of such additions, and to carry out the construction with such materials as will lend themselves to this idea, so as to produce the artistic quality of an old house, while introducing all the comforts of modern times.

While the general construction of the new house is now only up to the level of the ground floor, several rooms in the cellar are practically completed, and have been used for entertaining, while the family are still occupying the gardener's cottage upon the place.

The illustrations accompanying this article are from photographs taken while the decorations were in place for a Hallow E'en ball last autumn, which explains whatever incongruities may appear in some of the decorative features.

The main room is the "Refectory," finished in the style of the very early centuries. The type of interior construction is that found in many of the earlier castles and priorys of those times. The walls and vaulted ceilings are entirely of stone finish, with the stone-jointing thoroughly characteristic of the period.



An effort has been made to age the surfaces and give the general effect of years of use. Owing to the necessity of using electric light in making the photographs for the illustrations, the quality of the antique stone surface has disappeared in the pictures.

The "Refectory" is entered from the ground floor by means of a stairway, which is enclosed in a stone passageway of the same character. The steps show the irregular wear found on these early stairs. An effect of the spiral staircase has been produced by giving the stairs a half circle turn at the bottom, which does not interfere with the comfort of the descent, and yet gives a touch of the charm of the early, but uncomfortable, spiral stairway usually found in connection with such structures. At the foot of this stairway, one enters the main room through an arched doorway, and immediately on the left is a large archway opening into an adjoining room, somewhat raised, so that it may be used as a stage.

The finish of this stage is, in the main, quite different to the "Refectory" proper, with the exception of the end walls, which are in stone. The room is constructed with old oaken beams, filled between with plaster, finished to give the effect of a wall that has flaked off, and has been repeatedly patched and whitewashed. The beams used formed a part of the framework of a house at Mendham, N. J., known to have stood near the Hilltop Church for over a century, but which was demolished last year.

The seven-foot fireplace is merely a "hole in the wall," such as is found in the very earliest structures, and having no projection beyond the wall surface. There is just a suggestion of the beginning of the decoration of this feature through the introduction of crude mouldings around the opening, cut into the wall.

The cigar cabinet in the wall at this end of the room, has an antique copper door, from an old powder magazine at Fort Lenox, Province of Quebec, which has been abandoned for generations. The ventilating grills and some of the copper door hinges are also from Fort Lenox.

The bosses upon the ceiling are of English Portland stone, from the studio, at Broadway, England, of the late Frank Millet, who lost his life on the Titanic. The arched stone windows, with their foliated tops, forming a feature of the room, were brought from Guilford, England. The ironwork, all original pieces, had been collected abroad at various times.

One of the most interesting items of the room is that of the old oak doors, heavily studded with crude handmade spikes, and set in their original frames. They were the cell doors in the old "gaol" in Worcester, England, and were obtained by Mr. Allen at the time when that building was demolished.

The floor is irregularly and unevenly laid with old red tile in the main section, and with worn stone flagging in the raised alcove which is reached by a couple of well-worn steps. The original oak floor boards from the Mendham house have been used on the stage, giving a surface that can only be obtained through years of constant wear.

The lighting of the room in the daytime is by means of large area ways, in which the electric lights are so placed that in the evening an effect of moonlight is had through the leaded windows.

The interior lighting is principally by candles of varied sizes. Electric outlets have been provided in sidewalls and floors so that antique lanterns may be introduced when acquired.

The furnishing of the room is not yet complete, the owners preferring to collect, from time to time, as opportunity offers. Such articles as have been installed are of the very early English periods with the simplest of lines and decorations.

Connected with the "Refectory" is a duplicate of the butler's pantry directly above, but equipped with gas range, so that suppers can be prepared and served therefrom.

The "Refectory" will be used as a smoking room and for informal entertaining when the house is completed.

The old world atmosphere and the novelty of one's surroundings should, unquestionably, add greatly to the enjoyment of entertaining and of being entertained.

II. Planning the Specification

By Frederick N. Reed.

Mr. Reed has made a study of the art of specification writing and is often called upon by the more prominent New York Architects to specify their most important work.

TRADES that are partly preparatory and partly finishing, such as bricklaying and plastering, should next be taken up, leaving until the last such sections as foundation concrete and the structural steel and iron. There is an analogy between this method and that followed by structural engineers in designing a steel frame, their computations beginning at the roof tier and working down to the foundations, which are designed last.

The foregoing principle may be concisely stated thus: "Begin with whatever you can see,"—first, on a trip through the interior of the building; then taking up whatever can be seen from the outside, including an aeroplane view.

If the specification writer is to be free to write his sections in any order that seems best to him, it follows that continuous paging must be abandoned, since it is a good deal of trouble to page the specifications after they are written. This difficulty may be avoided by giving each section a letter for indexing, and then paging each section as a separate specification, the page numbers following the section letters, as "C-5" or "M-4."

The order in which the sections are actually placed in the finished work should appear in an index, and is generally the chronological order in which the various trades appear on the building. Thus, for a small frame house, the order would be: mason, carpenter, painter, plumber; the latter, being a comparatively recent addition to the trade family, being placed last. This answers very well on such work, but in a fifteen or twenty-section specification, too strict an adherence to the chronological order will prove inconvenient for the estimator. In such cases, I divide the trades into the following groups: preliminary, mason, steel and iron, roofing and metal working, woodworking, painting and decorating, mechanical equipment (this last group includes plumbing and its related trades). The various sections comprised in each group are afterward placed in a rough approximation to their chronological order. This grouping facilitates the estimating, since it brings related trades together. For instance, I always follow the structural steel and iron with the ornamental iron, regardless of the time when the mechanics in question appear on the building, since some bidders may wish to include both. It will be noticed that this order of the group heads has been determined by the order in which the first trade in each group appears on a fireproof, wall-bearing job, and I see no reason for varying that order even if a full steel frame be used.

As an instance of the evil effects of too strict an adherence to the chronological order, I may mention the common method of placing the division in the woodworking trades at the time of plastering, calling the sub-divisions "carpentry" and "interior finish". Now, the average carpenter generally places two principal orders, lumber and millwork; also one minor order, the stairbuilding, the first two being erected or set on his own payroll. As the lumber order generally includes the stock for finished floors, which is about the last piece of work to be done, and the mill order always include the window frames, which are among the first items that are required, the common arrangement is illogical and foolish from the estimator's standpoint. The proper arrangement in this case is based on the trade custom, the sub-divisions being called "carpentry" and "millwork". At first thought, the stairbuilding belongs under the millwork as the working processes of the two trades are similar. If, however, one reflects that the stairbuilding is almost made a separate sub-contract, it will at once be seen that it must not be included with the millwork. It may either be made a separate sub-division (or section), or it may be placed under the proper marginal head as a paragraph in the carpentry, which virtually amounts to the same thing from the carpenter's point of view. It should hardly be necessary to add that the specification writer must know just which items are commonly ordered from the lumber yard and which from the mill.

Having thus determined the order in which the sections are to be written and the order in which they are to finally be placed, actual writing may be begun. As commonly practiced, it proceeds something llke this, if the bricklaying, for instance, be under consideration: (The writer begins with the common brick because there is more of it than any other kind). "All walls, piers, parapet walls .... oh! yes, "step foundations," ah! um! "chimneys," of course there are chimneys, well I guess that's all, ending with two or three "etcs." to make assurance doubly sure,—"must be laid up with hardburned, common brick, in mortar composed of...." and so on. Subsequent mental effort recalls the fact that the work is not to consist entirely of common brick. This slight difficulty is at once corrected by the insertion, at the very beginning, of the phrase, "Except as hereinafter otherwise specified", and the work proceeds, the other kinds of brick being taken up whenever the writer happens to think of them.

Now, the difficulty in this case lies in the fact that the writer is trying to keep two entirely different matters in his head at once: the description of how the work is to be performed, and the description of the extent and placing of that work in the building. At this point, the English language fails, and I am obliged to resort to the slang of the specification room, calling the former the "dope" (perhaps because of its soporific effect on the proof-reader) and the latter the "listing", though some specification writers call it the "distribution".

It is better to list the entire job before adding the dope for two reasons: first, it requires far less mental effort to produce a coherent scheme of listing when all the listings are carried in the mind at once than when one is constantly being diverted by consideration of the dope; second, rapid work, which is frequently necessary and always desirable, is impossible unless dope covering a great variety of items has been accumulated and filed so as to be almost instantly accessible. It is well-nigh impossible to prepare dope for filing if the paragraphs include the listings, since these, which change with every job, must be left blank. It should be remembered that some trades lend themselves to separate listing much more readily than others, but I always do it whenever it seems practicable.

The task of listing a complicated building is always a difficult one, but as in everything else, a good system helps: and the best that I know is what I call that of the "residuary legatee". To illustrate: Let us suppose that a wealthy man desires to make his will, leaving the bulk of his property to his wife, but making also several minor bequests. The lawyer who draws the will does not begin with what is to go to the wife, as that would oblige him to list his client's entire

possessions. He first enumerates the minor bequests and then says, in substance: "The residue of my property I bequeath to my wife". She is then known as the "residuary legatee".

In applying this principle to specification writing, the materials occurring in the smallest quantity or in the fewest places should be listed first. These listings are usually short and easy to write. After they have all been picked up, the material occurring in a great many places becomes the residuary legatee and can be covered by some such phrase as "the rest of the building", "balance of the second story", "remainder of the service portion". It will be noted that if this method be consistently followed, *some* material will surely be specified for every part of the building, while any other plan obliges the specification writer to check all his listings most carefully at the peril of leaving some space entirely unprovided for. By the method of the residuary legatee, he can be charged only with a misunderstanding or a slip; while the failure to have specified any flooring, for instance, in a certain room may be rather difficult to explain.

Another great advantage of the residuary legatee method is that it creates, in the mind of the estimator, an absolute certainty that complete data are before him. It renders unnecessary that abominable word "except" and the still greater abomination, "except as hereinafter otherwise specified". Most estimators have learned by bitter experience that the exception to a clause in the bricklaying section may be found under the hardware; and as it is not always possible for a sub-contractor's estimator to read the entire specification, any uncertainty that is created in his mind is pretty sure to increase his estimate. He will feel there is something there that he has not discovered, and will add something to cover it.

The beginning of the bricklaying section previously referred to would much better have been something like this:

SECTION E.—BRICKLAYER'S WORK.

General Conditions.—The general conditions, section A of these specifications, are hereby made a part of the specification for the bricklayer's work.

Work Required.—The work required under this section comprises the following:

(*a*) Firebrick will be required for lining the boiler flue for a distance of 25 feet above the smoke connection.

(*b*) Enameled brick will be required for a 4-foot-six wainscot around the laundry on the 12th floor.

(*c*) Common brick will be required for all other brickwork shown on the drawings.

The various items in the listing serve as texts which are elaborated just below, in the same order, by the addition of the appropriate dope. The foregoing listing is given merely to illustrate the principle; the bricklayers have jurisdiction over several other materials beside brick, all of which should be included in this section.

It frequently happens that the same materials are used throughout one portion of the building, while the remainder of the building is finished with quite different materials. This is almost always the case in domestic work; and, in any case, if the building lends itself to a division into portions, the division should be made before starting the listing, such sub-division being of great assistance. As the definitions of the various portions, "Service Portion", "Family and Guest Portion", "Omitted Rooms", "Unfinished Portion" or whatever they may be, apply to all, or at least to several trades; they should be placed in the general conditions under the marginal heading of "Definitions", and the estimator's attention directed to them by appropriate cross-references in the various sections. The definitions must be worded with the utmost care, not merely so that they can be understood, but, to quote Arlo Bates, so that they cannot be misunderstood,—an excellent maxim, by the way, for the entire work.

Another advantage of separating the listings lies in the possibility of having them checked, either by the firm or by the inside man in charge of the drawings, before proceeding further. Since the listings must be written for each job, while the dope is usually adapted or copied from similar matter that has proved satisfactory in the past, it follows that the chance of a serious mistake is practically confined to the listing.

I have generally found that if I can get the listings checked by someone familiar with the drawings, the dope may be either dictated directly to the machine operator or copied from cards or from old specifications, with but little risk of subsequent change. A little practice will enable one to take in at a glance all of the matter under a single marginal head, note where the width of a brick joint must be changed from five-eighths of an inch to three-eighths, and to approve the paragraph for final copy. Even if a draft copy be desired, it will save time to make at one typing the entire number of copies that will ultimately be needed, for even if a quarter of the pages should have to be re-written, this method certainly saves re-typing the remainder.

Many specification writers select an old specification for a building similar to the one in hand, go through it with a pencil interlining and crossing out, and then turn the results over to a typist for a final copy. This may be the easiest way, though I consider that much better results may be obtained when the specifications are especially prepared for each building. In one of the best-run New York offices the specifications are dictated to stenographers who put the results on the machine in draft form. This is then very carefully gone over by the specification writer and the corrected draft re-typed for the final copies,—a very good method, but an expensive one, besides requiring much time, the entire work having to be typed twice.

Good building codes or sets of plumbing regulations are veritable mines of dope, but if the specification writer finds the code or regulations of the place where the building is to be built, satisfactory, I see no reason for inserting long extracts from them in the specifications. The general conditions will have made them a part of the specifications and a few scattered notes to the effect that the code standards for mortars, concrete, structural steel and similar items, will be accepted, ought to be sufficient. A little study of the regulations will enable one to avoid such a ridiculous mistake as the specifying of a back-vented system of plumbing in a town where the regulations prohibit back-venting and require non-siphoning traps. In any case it should be remembered that the standards set by the codes are seldom the highest that current work can reach, and that they should be stiffened up if an exceptionally fine piece of work is desired. Forming a group closely related to the codes are the standard specifications, such as the Manufacturers' Standard Specifications (for structural steel and iron), the National Electrical Code, and the standard specification for cement that has been adopted by the American Society for Testing Materials. This society has given much attention to the preparation of standard specifications of a nature similar to the foregoing.

In the choice of his English, the specification writer will not go far wrong if he remembers that the specifications are written primarily for the contractor's estimator. These men—and this is true to an even greater extent of the outside superintendents—are seldom college-trained, and the meaning must be made not only clear, but unmistakable to them. Long words of Latin or Greek derivation should be avoided, even though perfectly familiar to the trained architect. Personally,

I see no reason for adopting what may be called a legal style, though this is more tolerable in the general conditions than in the body of the work.

Lawyers however, are frequently required to pass upon specifications for important work, and this may be a good place to call attention to some of their peculiar prejudices. First, as to the wording of cross-references. There are two distinct methods of specifying preparatory work; it may either be included with the finish that is to be applied to it, or it may be specified in connection with the trade having jurisdiction over it. The reason for following the first method is to fix upon the sub-contractor for the finish the responsibility for the proper placing of his preparatory work, the assumption in this case being that he will sub-sub-let it to whoever gets the sub-contract for other similar work in the building. The other method better conforms to trade custom and, is followed consistently through the entire specifications, will result in a considerable saving in cost. In general, the "fixing responsibility" plan is better suited to new methods of construction with which the trades have not had time to become familiar. An example of this is the form work for concrete foundations. When it was a novelty, it was customary to specify the forms in connection with the concrete, but since carpenters have become accustomed to such work, we specify it in connection with the carpentry.

Whichever method be adopted, the arrangement must be made plain to the estimator by means of cross-references, or else both trades, in fear of the general conditions, may include the preparatory work. These references need careful wording if they are to pass legal scrutiny, for the lawyer will see clearly that, in a general contract job, only one contractor can be considered as existing. Although the architect may prepare his specifications so as to facilitate sub-letting and the contractor knows that he does so and each knows that the other knows, no suggestion of this fact must be allowed to get into type. The specification writer must, therefore, studiously avoid such wording as: "The necessary cinder concrete foundation" (for marble flooring, for instance) "will be placed by the sub-contractor for the cement mason's work", using rather some such wording as this: "The necessary cinder concrete foundation is specified in connection with the cement mason's work." (or "in section G"). Throughout the specification, the imperative forms "must" or "shall" should be used instead of the merely permissive forms, "may" or "is to".

One subject closely related to the specifications is that of the "material notes" that are frequently placed upon the drawings by the draftsman in order to preserve the results of decisions as they are made. I mean by "material notes," such expressions as "oak floor," "white pine trim to paint." The effect of such notes upon the contractor is to encourage him to neglect the specifications, since he can get a part of the information he needs without them. This is very unfortunate and, besides, materials are often changed, either after taking first estimates or during construction, and it is a difficult matter to make sure that such changes have been noted on all the prints. In my opinion, "material notes" should be entirely under the jurisdiction of the specification writer, and an experienced man will resort to them as seldom as possible. Their legitimate use is to make clear, in complicated places, the extent of the various materials, or to indicate the extent of the unfinished portion of the building. In the former case, the notes should be worded as broadly as possible—for instance, the form: "wood—¼—marble" is better than "oak—¼—red Numidian," since the oak may be changed to mahogany and the red Numidian to pavonazzo. Decisions resulting from conferences over the drawings should, of course, be preserved, and the inside practical man in charge of the drawings should keep a note book for this purpose, turning it over to the specification writer when the prints go to the specification room.

Most of what has been said applies only to the specifications that are to serve as a basis for the general contract. It is, however, sometimes necessary or desirable to prepare in advance an outline specification, either to serve as a basis for an approximate estimate or to present to the client in concise form a resume of the results of the various conferences in which he has taken part. In such work, the specification writer need only keep clearly in mind the particular person for whom he is writing, and govern himself accordingly.

I have left until the last the treatment of the mechanical part of getting out specifications. Probably 95 per cent. of all such work is put on the typewriter, the required number of copies being made by the use of carbons. At least six copies, and sometimes more may be made in this way. It is always a wise precaution to have the original copy backed up, which is done by placing, instead of semi, a sheet of full carbon between it and the first copy. When this has been done, blueprints may be made from the original, and this is the cheapest way to get a few extra copies to replace any that may be lost. For a larger number of copies, the inkograph or multigraph processes may be used. Specifications for public work in large cities are generally set up in type, in which case the Architect's duties are to furnish copy to the printer and to correct his proof.

The usual size of the paper is 8 inches by 13 inches, though 8½ inches by 13 inches, or even 8½ by 11 inches, are sometimes used. Top binding is the more common, and, for small work, the pages may be protected by an ordinary back, like those used in legal work, the top of the back being folded down twice and the pages secured by a couple of McGill fasteners. A neater method is to use the printed Manila covers that may be obtained from dealers in architects' supplies. They are made to fit either 8-inch or 8½-inch paper, and may be ordered with the architect's name and address printed on them. For long specifications, side binding in flexible linen covers is preferred, though this is open to the objection that the marginal heads, which are the guide-posts of the specification, are thrown close to the binding and are hard to get at.

Anyone who is familiar with the conditions existing in a general contractor's office when an important job is being estimated, will realize the desirability of putting each section together with a stapling machine and then securing the sections loosely in the cover. If this has been done, an experienced estimator will take the specifications apart, thus enabling several trades to work from them at once. For this reason, each section should begin a new page. Incidentally, the large number of partially-filled pages resulting from this method are a blessing to the specification writer, enabling him to add more copy at the last moment. If the system of paging previously recommended has been adopted, he will never have to resort to single-spacing, since pages may be added at the end of any section without interfering with the paging system.

I have known specifications to be written on very short pages, say, five or six inches high, by the usual width, and then bound in leather with flexible covers, by a bookbinder. This, with the titles stamped on in gold, produces an impressive effect.

At this point, the earnest seeker after truth (if he ever gets this far) will probably exclaim, "Why, there is nothing in all this about how to avoid extras!" He could make no greater mistake, for in this matter, the adoption of a good working system is half the battle. If the specification writer possesses the capacity for taking pains, and adds to that the mental habit of associating with each item the related work that it requires, the extra bill should be small enough to satisfy any reasonable client.

III. Heating Problems for Architects

By DeWitt Clinton Pond, M. A.

Mr. Pond has charge of the practical course in Architectural Engineering at Columbia University. He is the author of "Engineering for Architects," recently published in book form, the same being a series of articles formerly appearing in ARCHITECTURE.

THERE are many different systems of piping for steam, and each system has its advantages. The most common type of piping is the circuit system and this means that a circuit is run around the cellar under the ceiling and back to the boiler, and from this circuit all risers are taken off and connections made to the radiators. There are two kinds of circuit systems—the one-pipe circuit system, and the two-pipe circuit system. The one-pipe circuit simply takes a steam main line from the boiler to the highest point under the cellar ceiling and then carries this main around the entire cellar, taking off risers or branches where desired, and then returning to the boiler. The disadvantages of this system are that the pitch of this long main is considerable and the fact that near the end of the main much of the heat has been given off and risers at this point will be unable to supply hot, dry steam to the radiators.

It is better to have two circuits and this is what is usually done. With two circuits the pipes are carried away from the boiler and then continued in parallel lines on either side of the cellar ceiling. From these parallel mains the risers or branches are taken to the various radiators. If the return line from the main is brought back along the ceiling it should be simply designed as a "drip" connection, to carry back to the boiler the water of condensation from the main. No return lines from the radiators should be connected to it as there would be a "short circuit" and the steam pressure in the returns would be about the same as that in the risers and there would be little or no circulation of steam in the radiators. A separate return line should be carried along the ceiling of the cellar and back to the boiler, making three lines of pipe for each circuit—the steam main, the return, and drip pipes.

Usually, however, the main is carried to a point where the last riser is taken off and then dropped to a point below the water level of the boiler, and carried back to the boiler full of water. This is known as a *wet* or *sealed* return. The case given above is known as a *dry* return. It is quite possible to bring the returns from the radiators to this return pipe as all connections are made below the water level and there can be no back pressure in the returns to the radiators. In this method of piping there is only one pipe at the ceiling for each circuit, and that is the steam main itself.

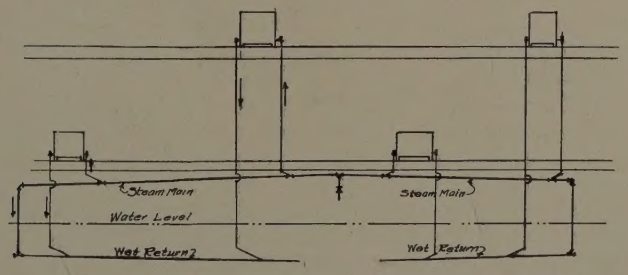


FIGURE 6 - TWO PIPE CIRCUIT

In Fig. 6 a diagramatic view is shown of a two-pipe circuit system, with wet returns. It will be noticed that there is a two-pipe system for the radiators and that the returns are carried to the return mains. Fig. 7 shows a dry return carried along the ceiling and a drip connection for the steam main.

The disadvantage of the dry return is that there is a large amount of water in the return main and the steam, coming in contact with this, rapidly condenses and causes a vacuum. Steam rushes in to fill this vacuum and catches the water which has been formed and dashes it along the pipe until some obstruction is reached. The water which is thrown

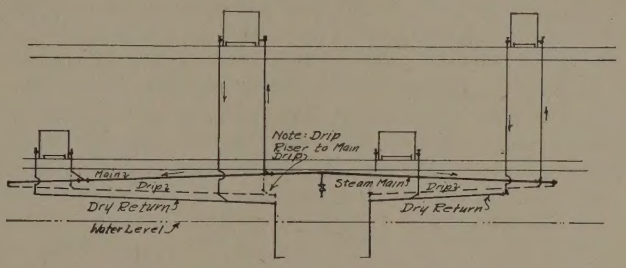


FIGURE 7 — DRY RETURN

against the obstruction causes a hammering sound in the pipes which is very objectionable. The wet return only has a small amount of exposed water in the return pipes and there is no cause for water hammer. For this reason it is always better to have a sealed return is possible, although there may be reason why it would be better to keep the return pipes high and away from the floor.

All circuit mains are pitched so that the water of condensation will flow back to the boiler. A dry return should have a pitch of one inch in every ten feet, but a wet return may have a pitch much less than this, the pipes being pitched one inch in every twenty or even thirty feet.

From the circuits, risers or branches are taken to the radiators. In two-pipe systems the risers and returns are as shown in Fig. 6, or Fig. 7. There is a single-pipe system which is advantageous and is often used in small installations, or in apartment houses and this is shown in Fig. 8. In double pipe connections to the radiators the steam pipes are smaller than the steam pipes in the single-pipe system. This is due to the fact that in the two-pipe system there is only steam in the steam riser, whereas there is both steam and water of condensation in the riser of the single-pipe system.

The process that is gone through in the design of a steam system really consists of four parts. It is first necessary to find the number of heat units lost in each room. It is then necessary to find the number of square feet of direct radiation necessary to supply the heat loss, and this is done by dividing the number of heat units by the "efficiency" of the radiator as described in the first article of this series. The next step is to add the square feet to be supplied to find the total number, and then to multiply this by 1.50 to find the capacity of the boiler—the boiler capacity is always figured as fifty per cent. larger than the total number of square feet of direct radiation. This determines the size of the boiler which can be found in the catalogues of the various manufac-

turers. The fourth step is the laying out of the piping system.

In the first article the efficiency of a radiator, filled with steam, and placed away from the wall in such a position as to have a free circulation of air all around it, was given as 250 B. T. U. per square foot per hour. If steam coils were used the efficiency would be higher as there is more chance for the air to circulate around and through the coils than through the average radiator. The efficiency of coils is therefore given as 300 B. T. U. per square foot per hour. This is also the efficiency of wall radiators. When radiators are concealed behind screens or are placed under seats their efficiency is lowered, and this depends upon how they are covered. The usual method of placing a radiator under a window seat in such a manner as to prevent the air from rising at all, and forcing it to enter and go out of the side, reduces the efficiency of the radiator to 200 B. T. U. per square foot per hour, and it is left to the discretion of the designer as to what efficiency he will consider proper under the various circumstances.

The materials used in the manufacture of radiators are cast iron, steel, and wrought iron. On account of its cheapness, strength and durability, cast iron is the most suitable for heating surfaces, although for high pressures steel or wrought iron are preferable and sometimes even necessary.

The cast iron radiator, an American invention, is the most common type of radiating—or heating—surface. There are hundreds of different designs, but there are two broad types—steam and hot water radiators. Steam radiators may

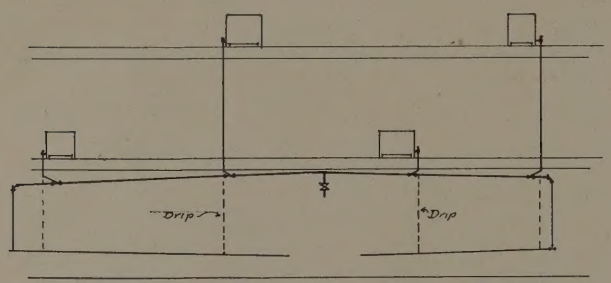


FIGURE 8 SINGLE PIPE SYSTEM

be connected only at the bottom but hot water radiators must be connected at both top and bottom. The reason for this is that steam, upon entering a radiator, rises and forces the air, which is heavier than steam, downward and out through the air valve into the room, or through an air pipe to a common outlet, or, in a "vapor" system the air is discharged with the water of condensation and returning steam through the returns and escapes through a common air valve located on a dry return main near the boiler. Hot water, however, rises in all sections at once and the air must be given a chance to escape through a top connection, which connects all these sections.

A hot-water radiator can be used for steam heating, but steam radiators cannot be used for hot water. For this reason it is often advisable to use hot-water radiators for steam systems, especially where an "open return line" steam heating system is installed, as with slight expense this steam system can be changed to a hot-water system by simply altering the fixtures to the boiler, if such a change is desired.

Radiators are made in sections, and for any one design these sections are made in many different heights. By looking at the "Ideal Fitter," or the catalogue of boilers and radiators published by the H. B. Smith Company, or any other catalogue, it is possible to find the desired heights, the number of square feet of radiating surface for each section for any given height, and the number of sections necessary to give the necessary B. T. U. per hour. Heights of the ordinary radiators vary from nineteen inches to forty-five inches, generally. The sections are usually known as two or three column sections, and of these the smaller number of columns is to be preferred as it is possible to have a more complete circulation of air around them. Wall radiators have only single columns and for this reason their efficiency is higher as stated above. Window radiators, which have sections about twelve, fourteen, sixteen inches high, are made of five column sections.

The end sections are made with legs and the intermediate sections without them, and the last section is tapped for an air valve. The air valve is made in such a manner that it allows air to escape but not steam. The closing of the air valve is caused by the expansion of a metal rod within the valve when the hot steam comes in contact with it. There are many types of air valves on the market, but as yet the perfect air valve is to be designed.

Wall radiators are held by means of brackets, designed by the different radiator manufacturers, and wall coils are held in the same manner.

The steel or wrought iron heating surfaces are found where coils are used, and there are now pressed steel radiators that are cheaper than cast iron and which are becoming popular.

In electrical laboratories it is necessary to use bronze radiators as the presence of iron often causes deflections of electrical currents.

In every catalogue of radiator manufacturers is found a section given to the types of special radiators, such as plate warmers, circular radiators, etc.

Knowing the number of B. T. U. lost, through the walls and windows of a room, and knowing the efficiency of the particular radiator that is to be used, it is possible to determine the number of square feet of radiating surface desired, and the number of necessary sections, their height, and the total length. All the radiators should be located near the exposed walls and under windows if possible. The next problem is the placing of risers.

If possible no risers should be located in exposed walls and so, if a radiator is near an exposed wall and happens to be on the second floor, a horizontal run of pipe should be taken to a riser located in an inside partition. For this reason it is advisable for the architect to know where his radiators are to be located and to frame his floor joist in such a manner as to enable the steam fitter to run pipes between them rather than making it necessary to cut them. The risers are brought to the basement and there are connected into the mains which are laid out in such a manner as to group all the risers to a few branches which may be controlled by equally few valves. There should be a main control valve at a point where the main leaves the boiler, and with this shut off all the pipes and radiators on this circuit can be shut off and this is one of the advantages of the two-pipe circuit over the one-pipe circuit. There should also be valves controlling each branch.

There are two types of valves that are in general use—globe and gate valves. Globe valves act on a seat and can be made tight in a manner that is not altogether possible with gate valves. The latter offer no obstructions, however, to steam or hot water and are preferred for that reason. In a general way it may be said that globe valves may be used on vertical runs, and gate valves on horizontal runs, as far as piping for steam is concerned. Hot water heating always requires gate valves as the only head causing circulation in a gravity hot water system is that due to the difference of weight of water at 180 degrees and—at the least—150 degrees. This comparatively slight difference in temperature causes only a

very small difference in weight and for this reason, in order to get an active circulation, it is necessary to have as few obstructions as possible.

In a following article these sizes of pipes for steam and hot water will be given in tables. To thoroughly understand how these sizes are determined it will be necessary to develop an actual heating problem, find the sizes of radiators, determine diameters of pipes necessary to supply them, and the diameters of mains that will furnish steam in sufficient quantities to the branches and risers. The limits of this article make it impossible to give all this at the present time. For the present it might be well for the architect to check the figures determined by a heating contractor for any particular problem that he may have. It is often the habit of architects to hand their heating problems over to contractors to settle for them. The wisdom of this course is doubtful, and the least that an architect can do in such a case is to check these figures by the method already given in these articles.

Legal Decisions of Interest to the Architect

These decisions appear monthly and are edited by Mr. John Simpson, the well-known lawyer.

Compensation of Superintendent.

ARCHITECTS were employed by a county to furnish preliminary sketches, contract, working drawings, specifications, detailed drawings, and general superintendence of the building operations of a courthouse and jail. The contract on file in the office of the county commissioners further provided that, when the buildings had progressed to the extent to justify daily superintendence, the county should select a superintendent who should be paid by the architects, the compensation not to exceed $—— per month. The county employed a superintendent, but made no contract with him as regards his compensation, and paid for a part of the time at the rate of $5 a day. In an action by the superintendent against the architects, the Trial Court found that the real agreement between the architects and the county was that the superintendent's compensation should not exceed $75 a month, that the superintendent had no knowledge of this agreement, and that he could not recover more than that amount from the architects. On appeal, the Oklahoma Supreme Court held that the architects, by their contract with the county, having constituted the county their agents to hire the superintendent, and as his compensation was left blank in the contract on file with the county, the only one to which the superintendent had access, there was nothing to put him on notice that any specified sum had been agreed to as his pay; and under these circumstances it was the duty of the architects to have ascertained what compensation the county had agreed to pay the plaintiff. Having received the benefit of his services while he was acting under the belief that he was to be paid at the rate of $5 per day, they were liable to the superintendent for the reasonable value of his services.—Miller *v.* Hair (Okla) 154 Pac. 1002.

Claim for Extra.—Architect's Decision Binding on Contractor.

A contractor contracted to erect a building for an owner, which was to be either six or ten stories high, as the owner should determine during the course of construction. In accordance with this understanding, provision was made for three elevator shafts, two to be used in the event the building went only six stories, in which case the extra space was to be otherwise utilized, and three elevators being contemplated if the building went ten stories. The architect was made an umpire to decide disputes between the parties under the contract; his decision to be final and binding. The owner decided on a ten-story building, and fixed with the contractor the price therefor. After the erection of the building the contractor presented a claim for the third elevator as an extra, which the owner refused to pay, claiming its installation to be covered by the price as fixed. The contract, plans, and specifications were reasonably open to either construction regarding the price of the elevator. In an action for the price as an extra the Washington Supreme Court held that the decision of the architect in favor of the owner was binding on the contractor, the decision not being fraudulent, arbitrary, or the result of palpable mistake on the architect's part.—Sound Construction etc. Co. *v.* Green (Wash.) 154 Pac. 791.

Contract for Services for Unauthorized Construction.

In an action by an architect against county commissioners for damages for breach of a contract for the preparation of plans and superintendence of construction of a courthouse, it appeared that the commissioners had decided to erect the courthouse on the "rental plan," and had agreed to pay the plaintiff five per cent. of the sum expended in construction. Owing to an adverse decision of the Oklahoma Supreme Court, deciding that the statute expressly permitting the erection of courthouses on the rental plan was inoperative, because repugnant to the State Constitution, the plan was abandoned. Afterwards bonds to provide funds for the construction of the courthouse were voted. The plaintiff offered his services as architect as provided in the original contract. They were refused, the original contract was ignored, and the county commissioners employed other architects. It was held that the county was not liable to the plaintiff for damages sustained, he having entered into a contract with the commissioners to assist them in doing an illegal act; that is, to erect a courthouse when no funds had been provided for that purpose.—Weathers *v.* Board (Okla.) 154 Pac. 642.

Effect of Termination of Contract on Liquidated Damages.

In an action against a city for the balance due on a building contract, the city counterclaimed for liquidated damages of $25 a day for delay and failure to complete the work and was allowed $875 therefor, reckoning the sum due from the date when the city took possession of the building and proceeded with its completion. On appeal it was held by the Washington Supreme Court that the city could not terminate the contract and at the same time claim liquidated damages for delay, though, of course, it could claim actual damages; but of these there was no evidence, therefore the claim should have been disallowed.—Garey *v.* City of Pasco (Wash.) 154 Pac. 433.

Contract for Architect's Services too Indefinite for Enforcement.

An architect and an owner entered into an agreement for the preparation of plans of a contemplated building, in accordance with which plans were prepared of the value of $1,800. The owner determined to postpone the erection of the building and to effect a settlement with the architect, she signed an agreement that if she should at any time desire to erect a building in any place in Seattle or Everett, she would employ the architect to prepare the plans and superintend the construction of it. She subsequently employed another as architect and contractor to erect a building in Seattle. In an action for breach of the agreement, the Washington Supreme

Court held that the contract was too indefinite and uncertain to be enforced. It failed to state on what terms the employment was to be entered upon, whether the architect or the owner was to name the terms and conditions, or whether they were to be determined mutually.—Ryan *v.* Hanna (Wash.) 154 Pac. 436.

AGREEMENTS TO ARBITRATE MUST BE CLEAR.

While the law favors the settlement of disputes by arbitration, it will compel parties to resort thereto only when the terms of their contract are clear and certain in showing they have such intention. Contractors agreed with the owners to build certain foundations for a building, and that they should be paid an amount to which was added all extras for changes ordered by the architect and from which was subtracted all amounts by which the changes decreased the cost of building, but that in case of dispute as to the true value of any work added or omitted by the contractors, the same should be arbitrated by appealing to the city superintendent of buildings. It was further agreed that in case any difference of opinion should arise in relation to the contract, the work to be performed under it, or the plans, drawings and specifications, the decision of the architect should be final and binding. Liquidated damages were stipulated for delay in performance. In an action for a balance due on the contract, the real controversy was over claims for extra work and material required because of change in plans of the structure, and also a claim of demurrage made by the owner because of the contractor's delay. The superintendent of buildings had declined to act as arbiter. The owner contended that under the terms of the contract the architect became the agreed arbiter of the disputed items of change by the contractors, and the disputed item of demurrage. The Washington Supreme Court held that the language of the contract negatived the idea of the architect being the arbiter of the questions involved, there being no question of the proper performance of the work or the proper quality of material used. It was in any event not at all certain that the parties to the contract agreed to make the architect the final arbiter of any of the questions involved. That of inself would entitle the contractors to resort to the Courts. —Russell & Gallagher *v.* Yesler Estate (Wash.) 154 Pac. 188.

DOUBLE COMMISSIONS NOT RECOVERABLE.

The Circuit Court of Appeals, Fourth Circuit, holds that, under a building contract providing that the contractor was to furnish all the material and perform all the work in erecting the building and was to be paid the cost of the labor and material necessary, and in addition 10 per cent. thereof as commissions, the contractor was not entitled to commissions on the profit made by a subcontractor on labor and material furnished by the latter. It would be unjust to require the owner to pay double commissions for any material furnished or labor performed.—Grafton Hotel Co. *v.* Walsh C. C. A., 228 Fed. 5.

COMPLIANCE WITH STATUTE BY FOREIGN CORPORATIONS.

A Florida statute provides that every contract made by or on behalf of any foreign corporation, affecting its liability, or relating to property within the State, before the corporation shall have complied with the provisions of the statute, shall be void on its behalf and on behalf of its assigns, but shall be enforceable against it or them. A foreign corporation entered into a building contract before it had complied with the statute by filing a copy of its charter or articles of association, and obtaining a permit to do business. Pending the performance of the contract, however, the statute was complied with, and thereafter, as the dealings between the parties progressed, each party invoked the written contract as the basis of its rights and obligations. In an action to enforce a mechanics' lien, the Circuit Court of Appeals, Fifth Circuit, holds that this amounted to an adoption of the instrument as the evidence of the contract under which the dealings were carried on, and estopped the other party to the contract to set up a lack of right in the foreign corporation to claim under it. Though the contract was unenforceable when made, the foreign corporation, after complying with the statute, could acquire rights theretofore ineffectually contracted for by the operation in its favor of an estoppel, or by joining with the other party in adopting, as the evidence of an existing contract between them, the written instrument previously signed.—Turner Const. Co. *v.* Union Terminal Co., C. C. A., 229, Fed. 702.

SPECIAL PROVISION IN SPECIFICATION AS TO EXTRA WORK.

A building contractor's failure to complete the contract does not preclude it from recovering for extra work, labor, and materials outside of and beyond the scope of the contract, furnished at defendant's special instance and request. A building contract in the main contract contained no provision regarding extra work, but attached thereto were six distinctive sets of specifications, covering electric work, painting, carpentering, etc. In the specifications covering carpentering there was a provision that no extra work would be paid for unless the price had been previously decided upon and the work ordered by the architect. The New York Appellate Division holds that this applied only to the work covered by that particular set of specifications.— Along-the-Hudson Co. *v.* Ayres, 156 N. Y. Supp. 58.

OWNER'S RIGHT TO PAYMENT FROM INSOLVENT SURETY'S ASSETS.

The New York Appellate Division holds that where a bond was given to secure the performance of a building contract, conditioned for payment on refusal or failure to continue the contract, and the contractor in May refused to continue, the liability then became fixed, so that the obligee was entitled to first payment from the assets of the surety, against which insolvency proceedings were commenced the following January.— People *v.* Metropolitan Surety Co., 156 N. Y. Supp. 1027.

CONCLUSIVENESS OF ARCHITECT'S CERTIFICATE.

A provision in a contract that the work should be done to the satisfaction of an architect, and that his decision should be final and conclusive, was valid and enforceable, and, though his decision might be impeached for fraud and bad faith, it was error, in an action for work which was not satisfactory to the architect and was ordered removed by him, to submit to the jury the question as to whether the work was properly done.—Di Merina Const. Co. *v.* Anchor Post Iron Works, New York Appellate Division, 153 N. Y. Supp. 826.

BUILDING RESTRICTION BECOMES UNENFORCEABLE.

Where all the lots in a building controversy were originally sold for residence purposes on condition that no building less than two stories in height nor nearer than ten feet to the street line should be constructed thereon, but for a long time prior to the controversy the street had been a business street and had been widened by condemnation proceedings by the city, so that buildings already constructed thereon were within the ten-foot line, the New York Appellate Division holds that the plaintiff could not enforce the condition of the deeds, since in equity the reason for its imposition no longer existed.— Pappas *v.* Excelsior Brewing Co., 156 N. Y. Supp. 845.

CONSTRUCTION OF BUILDING RESTRICTIONS.

An owner of real property has an unquestionable right to restrict its uses by covenant or agreement, and such restrictions will be upheld by the Courts, provided they are reasonable, and not contrary to the public welfare, and effect will be given to the intention of the parties, as shown by the words used, considered in connection with the surrounding circumstances. But

if, when so considered, the language used is reasonably capable of two constructions, the one that limits, rather than the one that extends, the restriction should be adopted, for the reason that the law will always favor the free and unrestricted use of property, and therefore all doubts and ambiguities must be resolved in favor of the natural right to the free use and enjoyment of property and against restrictions.—Schoonmaker *v.* Hecksher, 157 N. Y. Supp. 75.

Penalties Under New York Tenement House Law.

The New York Appellate Division holds, in an action for a penalty under Tenement House Law, § 124, for a violation of section 120, prohibiting the making of alterations not in accordance with plans filed with the board, that evidence that the plans which were in evidence were filed, but without proof that they were in effect when the alterations were made, or that they were ever approved, or a permit thereunder issued, or that the alterations were made after the filing of the plans, was insufficient to support a judgment for the penalty, since in order to recover it was necessary for plaintiff to prove the filing of specific plans, the approval thereof by the tenement house department, the making of the alterations after such filing and approval, and the nonconformity of such alterations to such plans.—Tenement House Department *v.* Whitelaw, 157 N. Y. Supp. 277.

Liquidated Damages.

It is competent for the parties to a building contract to stipulate for the payment of liquidated damages on the failure of the contractor to complete the contract on the day named, where the amount agreed upon from all the circumstances does not appear to have been so unreasonable as to suggest the intention of the parties to provide for a penalty. A clause in a contract for the construction of a manufacturing plant to be occupied by the owner, provided for the payment by the contractor to the owner of a specified sum of money—namely $75—for each day the manufacturing plant should remain unoccupied after a certain day agreed upon between the parties for the completion of the plant. The Florida Supreme Court held that it appeared from the circumstances surrounding the formation of the contract, the situation of the parties at the time, the certainty that some damages would accrue to the owner by reason of the failure to comply with the contract on the contractor's part, but uncertainty as to amount, the difficulty of ascertaining the damage that might accrue, and the language of the contract, that it was the intention of the parties to stipulate for liquidated damages and not for a penalty, allowing actual damages merely.—Southern Menhaden Co. *v.* How (Fla.) 70 So. 1000.

Liens.—Purchases for Cash Only.

When a materialman is put on notice that the owner's agent has power to purchase for cash only, and the materials are charged to the owner, and no notification to the owner is shown, the materialman does not acquire a lien against the owner.—Gulf Iron Works *v.* Gandy, Florida Supreme Court, 70 So. 366.

Excessive Lien Wholly Bad.

As lien laws tend to burden the sale of property, they must be claimed in good faith. The law will not punish the liener for trifles included, or even for large sums which are fairly debatable in law; but it will not allow an obvious misuse of the statute. A contractor agreed to build a house for $1,064, and deposited a certified check for $300 to secure his good performance. The owners paid him $818, and admitted that they owed $259, which included a trifling extra. The contractor, claiming many more extras, invoked an arbitration clause on that feature, but received an award of only $247.25. He then filed a mechanic's lien for substantially twice what the arbitrators allowed him and the $300 deposit besides, or, in exact figures, $814.95. The Washington Supreme Court held that the whole lien was bad because of its containing an obvious and willful excess. There was no time when the plaintiff could honestly have thought himself entitled to more than half of what he claimed in his notice of lien.—Knibb *v.* Mortensen (Wash.) 154 Pac. 1109.

Rights of Mechanics' Lienholders—Arizona.

The Arizona mechanics' lien act of 1913 provides for liens for labor and materials furnished in the construction and repair of buildings, whether the work was done or articles furnished at the instance of the owner or his agent, and declares that every contractor shall be the agent of the owner, and the owner shall be liable for the reasonable value of labor or materials furnished to an agent. A complaint, seeking to foreclose a materialman's lien, averred that the contract price and reasonable value of materials furnished under an express contract was a given sum. It was held that, as the lien is for only the reasonable value of the materials furnished, recovery might be had on proof of their reasonable value, without proof of an express contract. A materialman, while entitled to a lien for the reasonable value of the property furnished, is not entitled under the act to a personal judgment against the owner for the contract price.—Harbridge *v.* Six Points Lumber Co., Arizona Supreme Court, 152 Pac. 860.

Stop Notices.—New Jersey Statute.

A building contract contained the following clause: "Should the contractor, at any time during the progress of said work, refuse or neglect to supply a sufficiency of materials and workmen, the owner shall have power to provide materials and workmen after three hours' notice in writing being given, to finish the said work, and the expense shall be deducted from the amount of the contract." The clause was put into operation before the building was completed by notice being given by the owner to the contractor. The contract was for $6,634. At the time the notice was given and the owner undertook to finish the contract, he had paid the contractor $3,100. Stop notices to the amount of $2,466.52 had been served upon the contractor by the sub-contractor. The contractor brought an action to recover from the owner the difference remaining between the amount paid by the owner on the contract, plus the expense the owner was put to in completing the building, and the contract price of $6,634. Judgment for the plaintiff was affirmed. It was held that the owner was not entitled to be credited with the amount of the stop notices served on the contractor, as it did not appear that he had paid anything on them. The Court quoted from Wightman *v.* Brennan, 26 N. J. Eq. 489, as follows: "The owner's right to deductions or allowances, by the statute, is restricted to payments. Until actual payment, or something which in law is its equivalent, no allowance can be made. Notice creates a right against both owner and contractor, but does not constitute a payment or operate as a credit." It was also held that any expense incurred by the owner in doing work not contemplated by the plans and specifications should not be deducted. It was immaterial to the result of the action whether the contractor had been rightly or wrongfully excluded from the building. Plans and drawings prepared by an architect, a witness in the case, which showed error in the construction of the front of the building and were prepared after the building contract was signed and while the building was being constructed, were held incompetent as evidence.—Coppola *v.* Grande, New Jersey Court of Errors and Appeals, 96 Atl. 67.

Electricity for Builders

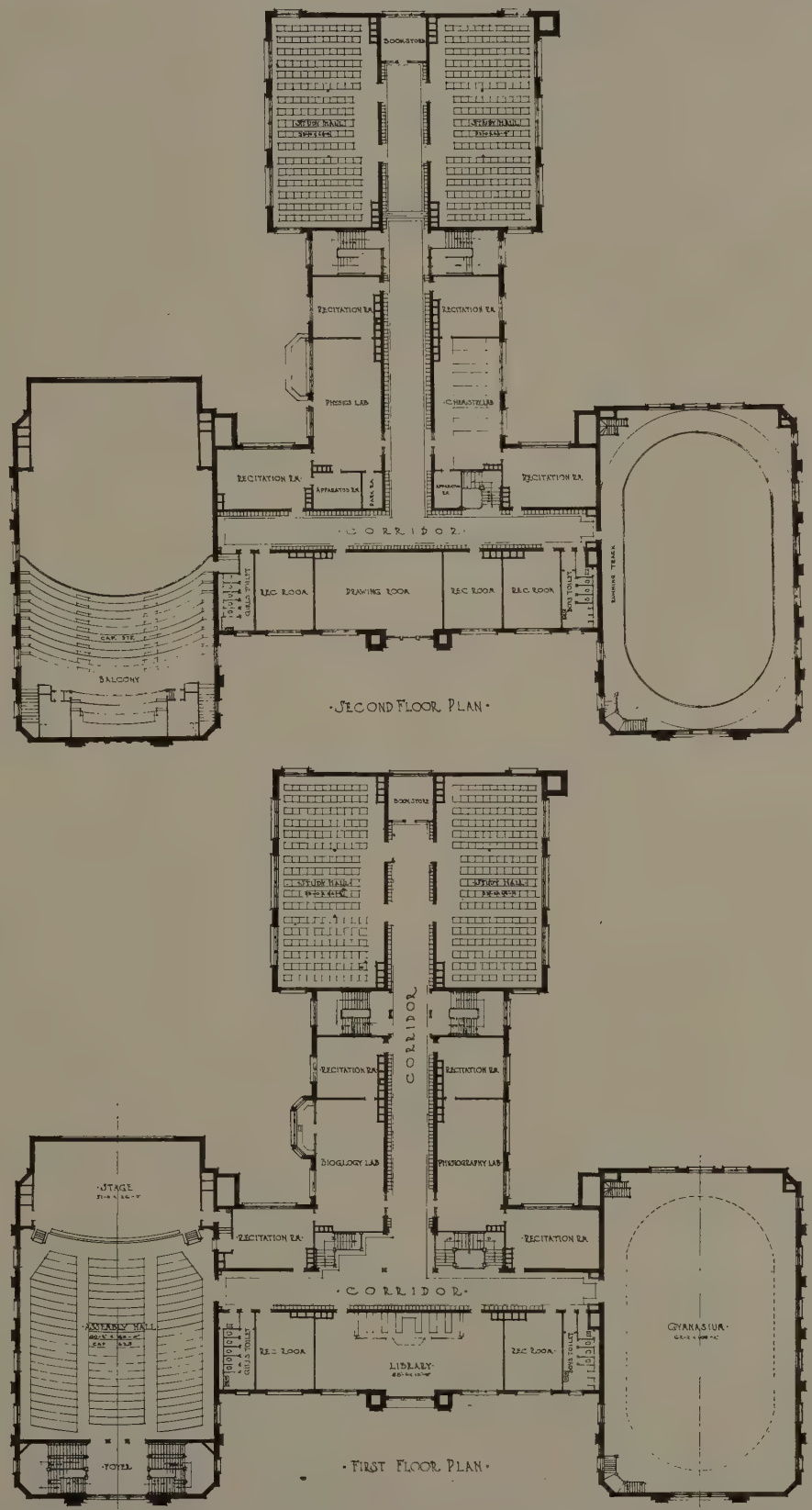
THE service to which electricity can be applied in the construction of buildings, both small and large, and of any material, is increasing and is found indispensable by builders who appreciate the worth of the electric motor-driven devices now placed at their disposal. We have been particularly interested in a paper read some time since by Mr. J. E. Van Hoosear before the Builders' Congress at San Francisco, in which he summarized some of the electrical aids now being utilized from the clearance of the building site to the last operation of polishing the floors.

Starting with the pioneer work of clearing a heavily wooded site, a motor-driven wood saw is set up to work into cord wood any timber that may be standing on the premises; next, electricity is used to explode powder in removing stumps or rocks from the site; the excavation is accomplished by means of a motor-driven excavator which deposits the dirt into trucks that haul it to the dumps and in return deliver the rock, sand and cement that are used in the construction of foundation and walls. In a great number of places where the excavation is deep, large quantities of water accumulate, and it is necessary that this water should be removed in order to proceed with the foundation work; this is easily accomplished by means of a motor-driven pump, which needs very little attention, as it can be equipped with an automatic float switch, which will keep the water out night and day. From this stage on, a motor-driven saw is found very serviceable to do all the rough sawing necessary in the construction of the concrete forms and the building frame.

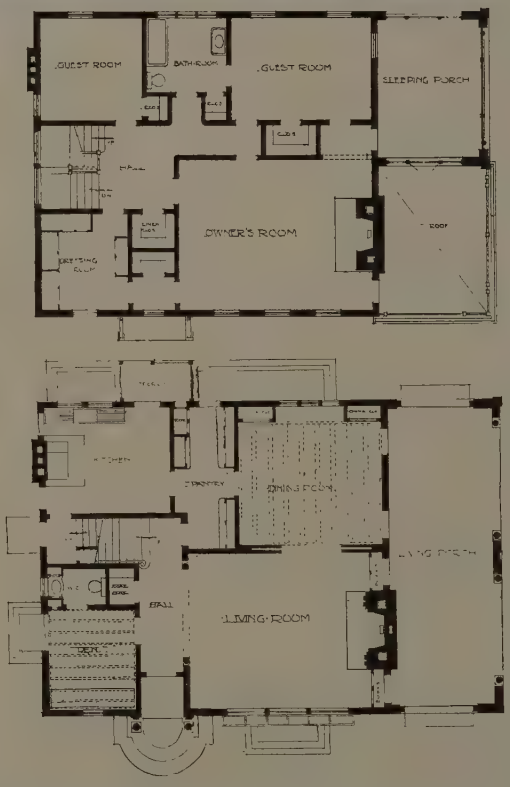
The concrete used for foundation walls, floors and walks is mixed in a motor-driven mixer, and hoisted to different levels for distribution by means of a motor-driven lift supplied with a special dumping bucket. The bricks and other materials are also hoisted to the several floors by means of electric hoists, thereby saving time and adding to the efficiency. Some data has been gathered in connection with concrete work in regard to the quantity of power required in mixing and other work directly connected with it. In a reinforced concrete loft building of three stories, three thousand yards of material were used. A one-yard mixer driven by means of a 15 h. p. motor handled the material, a saw driven by a 5 h. p. motor cut all the lumber used in making the forms. These two motors consumed a total of two thousand kilowatt hours, or about one and five-tenths yards per kilowatt hour. In a steel structure concrete building of eighteen stories, using one thousand seven hundred and eighty-two yards of material, eight hundred and twenty-nine kilowatt hours of electric current were used, showing a consumption of one kilowatt hour for each two and fifteen one hundredths yards mixed. The last named job was done by a contractor who owned several gas-engine-driven mixers, which he had been using for a number of years. He set one of them up to do this work, and after running a couple of days it developed troubles, causing delay and expense. An electric motor was then secured to complete the work, which it did in the usual satisfactory manner. Now he, like many others who have taken the interest to look into the merits of electric-driven machines, will have no other mode of operation.

If the outside walls are to be plastered this can be speedily accomplished by means of a motor-driven compressed air plastering machine, which will lay on a coat of cement plaster to any thickness desired. If the building is of steel structure the beams can be hoisted and placed by means of an electric-driven hoist. In connection with the placing of steel, it has been the opinion of a large majority of those directly interested in this work that the operation can only be accomplished with satisfaction by means of the steam donkey engine. Precedent, like a rut in a road, is one of the easiest things to follow, and one of the most difficult to get away from. Upon a close study of the matter it is found that the reason for this contention is they either own engine-driven hoists or have tried to do their work with improvised electric-driven apparatus, which was found unsuited to the task, and, being dissatisfied with results, would not listen to anyone regarding the up-to-date motor-driven appliances, that have speed and control equal to the best engine-driven hoists. It would be well for anyone who is contemplating getting new equipment to investigate the merits of the electric hoist. After erecting the steel, the rivets that hold it together are driven home and headed by means of hammers operated with compressed air, which is supplied by a motor-driven compressor. The plaster which finishes the walls is mixed by motor-driven machinery, that has been found to give a more thorough mix than was obtained by the old method. In marble work motor power is found necessary from start to finish, even to the chiseling and drilling that is necessary in the process of setting it in place. In fine interior hardwood finish the electric glue-pot is found indispensable, and is not a fire hazard.

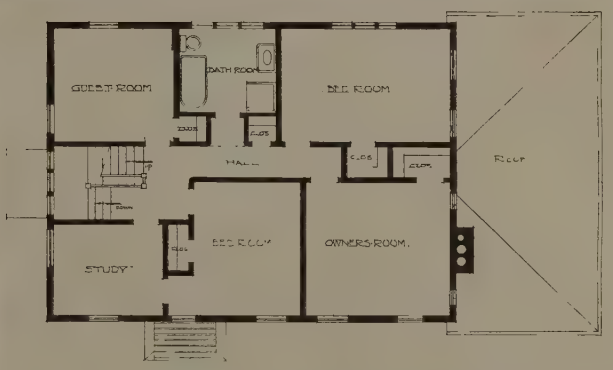
A unique method of mixing and delivering concrete, differing considerably from the old way, is used to advantage in cases where heavy walls are to be built, or in places where the forms cannot be reached from above, and is accomplished by means of compressed air. There are two quite distinct patented ways of doing it. The first requires the usual motor-driven mixer, which in turn deposits the mix of about twenty cubic feet into the upper end of a cylinder-shaped tank four feet in diameter and eight feet long, cone-shaped at the lower end and connected with an eight-inch pipe line, that delivers the charge to the forms, that may be located a considerable distance away, in some cases as far as two thousand feet. The charge is driven from the receiver by means of compressed air under one hundred pounds pressure to the square inch at a rate of one charge per minute where the distance is around three hundred feet, or about three minutes where the distance is one thousand five hundred feet, and requires a 200 h. p. motor to drive a one thousand two hundred foot air compressor delivering at one hundred and twenty-five pounds pressure per square inch. The other method uses a smaller tank with five-inch delivery pipe; the charge of about ten cubic feet of sand, rock, cement, and water is delivered direct into the tank, no mixing machine being used. The cover is then closed and the compressed air turned into the tank and forces the charge up to the desired location. In passing through the pipe-line the material becomes thoroughly mixed. Both of these machines have been used on large tunnel jobs in San Francisco with satisfactory results in cost of delivery of material and quality of work, and there is no reason why they should not be used in building construction as satisfactorily.

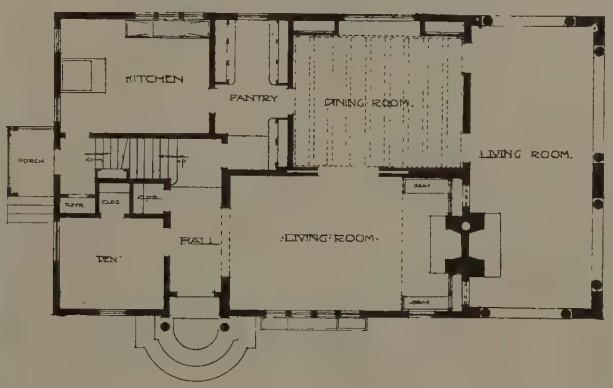


PLANS, HIGH SCHOOL, PONTIAC, MICH. Perkins, Fellows & Hamilton, Architects.

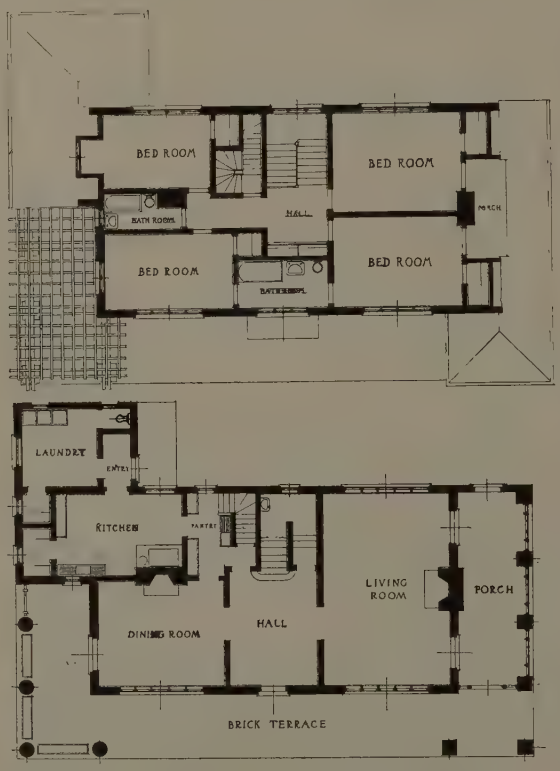


HOUSE AND PLANS, WM. R. DE VRIES, IDA GROVE, IOWA. Bernhardt E. Muller, Architect.



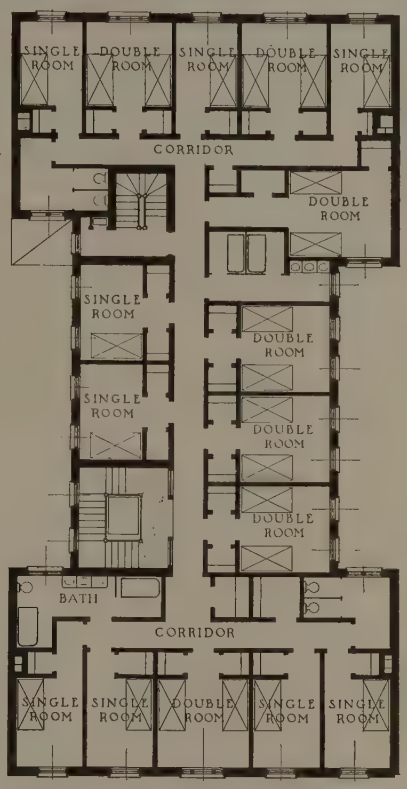


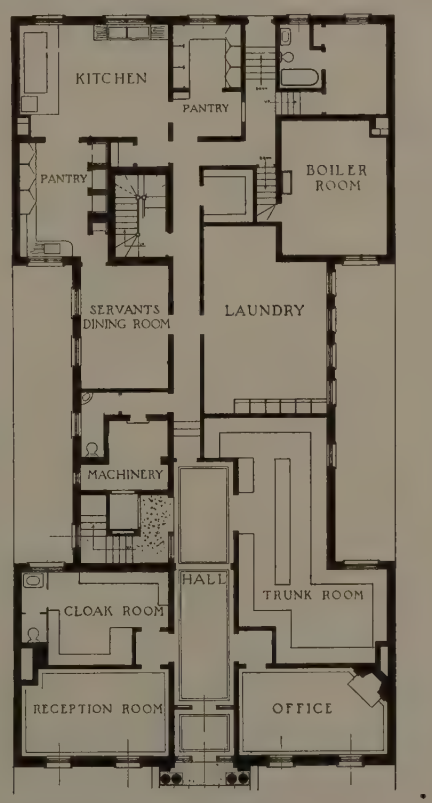
HOUSE AND PLANS, S. S. WARNER, MAPLEWOOD, N. J. Bernhardt E. Muller, Architect.

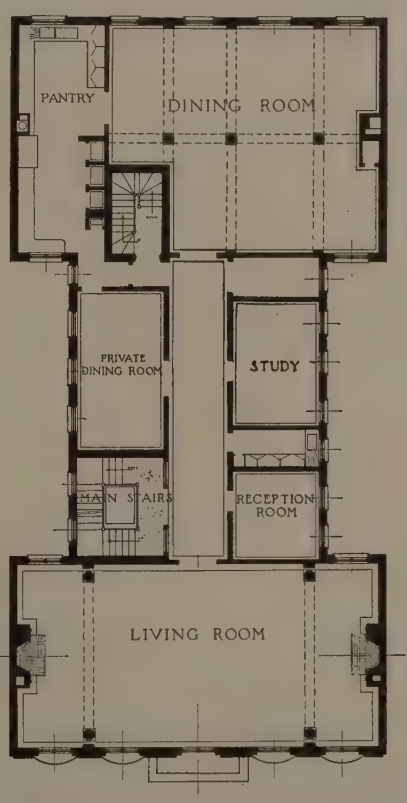


HOUSE AND PLANS, WILLIAM WIESE, SAGAMORE PARK, BRONXVILLE, N. Y. Gustave E. Steinback and Otto R. Koechl, Architects.

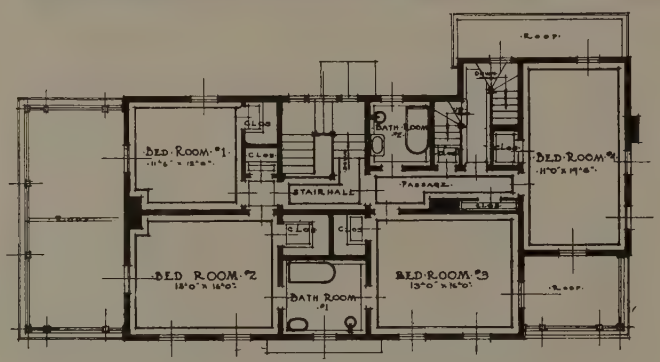
Photo by Boston News Co.

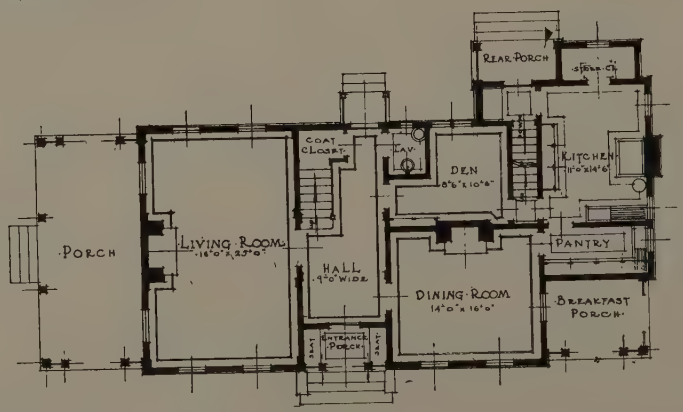






STUDENTS' HOUSE AND PLANS, FENWAY, BOSTON, MASS. Kilham & Hopkins, Architects.





HOUSE AND PLANS, GARDEN CITY, L. I. Alfred Busselle, Architect.

ARCHITECTVRE

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PLATES AND ILLUSTRATIONS

Editorial

New York Central Tracks on Riverside Drive—Architectural Exhibits

ONE of the most difficult problems about the development of almost every American city has been the disposition which should be made of its railroad tracks, as the city expands. Railroad tracks were, in the past, much more things of horror than they are at the present time, but in spite of the care with which the roadbed is kept, and in spite of the electric locomotives which do away with the smoke, they are still ugly, noisy and dangerous. Unfortunately it has happened that the railroads have entered our cities by the easiest ways, which means that they have generally followed the courses of rivers, or lake sides, where grades were at a minimum, and terminal facilities could be readily arranged in conjunction with ships or river steamers. This resulted in Chicago in shutting off the entire southern water front of the city from access to the lake, because the Illinois Central Railway had a right of way for very many miles. Chicago took hold of the problem some years since, and by sinking the railroad tracks for a large portion of the distance and by building terraced gardens on the city side of them, and further by filling in outside of the railroad, and building beaches and parks they have finally succeeded in

reducing the railroad nuisance to a minimum, although it is by no means completely eliminated, especially as the trains still use coal-burning locomotives. The problem in Pittsburgh is quite as bad; each side of the promontory on which the city rests, runs up rather steeply from the river, and has been in many cases parked, but invariably it is cut off from direct access to the river by wide, ill kept, railroad tracks, and sometimes by switching yards, so that as far as the city goes, its water front is wasted artistically, and because of the comparatively small use now made of the rivers, is not of much value commercially. No beginning has as yet been made in Pittsburgh to do anything with the railroad tracks, although several tentative plans have been made for their better treatment.

New York has for a very long time been in much the same condition; a city possessed of an extent of water front, not only in itself tremendously long, but probably also larger by comparison with the area of the city than is the case in any other city in the world, and there are very few spots in which the citizen of the city can reach the water's edge. Even the small Battery Park at the extreme southern end of the island, is somewhat choked up by municipal piers, by the Aquarium, and by the Barge Office. None of the parks on the lower part of the East River on the New York side has any appreciable shore front, and the little Carl Schurz Park, and Jefferson Park are so small as to be negligible. Blackwell's Island, which might have been a great recreation center, is hardly that at the present time, and while fairly extensive provision has been made for future parking spaces in the Bronx, Pelham Bay Park, and Hunter Island, the great shore front of Brooklyn, and all the great shore front of Queens Borough is practically without parking spaces.

The one decent water side park which New York has is Riverside Park, and this has long been separated from the water by the tracks of the New York Central Railway. The New York Central, it seems, was given a perpetual franchise very many years ago, and has run its tracks on what is now Eleventh Avenue, continuing up the water side almost all the way to Albany. It has therefore cut off from access to the water practically every city, town and village on the easterly bank of the Hudson River, and the detriment to the public interest has been directly comparable with the number of people affected.

In New York the situation has been rendered more acute by the very numerous accidents on Eleventh Avenue, and partly because of these accidents, and partly because of the great number of people who use Riverside Park, a strong enough sentiment has finally been aroused to compel the railway to consent to the covering over of its tracks along the park, and to raising it on an elevated structure to the south of the park; the best single piece of news that New York has had in very many years. The space over the tracks will be filled in, seeded, and planted to form a continuation of the park down to the very water's edge, so that for three miles at least New York will have a park fronting the North River, and entirely unobstructed by wharves, piers, buildings and railroad tracks.

The final triumph of public opinion here in New York should prove an encouragement to the other cities confronted with like problems, and is but one of many signs which point to a tremendous awakening of collective interest in community problems, and the beginning of a realization that it is necessary to subordinate individual ends for the aesthetic good of the community.

There has probably been in no town or city in the United States any such organized and conscious city growth as there has been in certain of the European cities; people have shrugged their shoulders and said that in a republic or self-governing municipality it would be impossible to do things in the way in which an autocracy could carry them out. This is perhaps true, but it has not been any excuse for the slipshod and haphazard way that our communities have attended to their affairs in the past; there is an old legal maxim that no man shall so use his own property as to make it a detriment to others, and that is the sole limitation which has already been placed upon construction work in our cities. Its place is gradually being taken by a series of regulations which little by little, and without much coherence, show steady growth toward an ideal condition, in which every man shall so use his property as to make it of communal, as well as of individual benefit. There are an infinite number of small signs which point toward this condition of affairs: the zone system of which we spoke last month, this Riverside improvement, the appointment of municipal art commissions to regulate public improvements of every kind, the bills for the limitations of heights of buildings, and of course, a very great number of sanitary, fire provision, building and tenement laws, which the public is coming to accept as a matter of course, instead of resenting them (as at first) as an invasion of private rights. With the steady growth of this civic pride, or if you will, civic vanity, we may hope to see our cities become daily more livable, more uniform, and more artistc.

THERE has been after every annual exhibition of the different architectural clubs and societies, some discussion of the character of the exhibits most suitable for exhibition purposes; some members of the profession believing that the architectural shows are, by a profusion of photographs, tending too much to "prettiness," while others believe that this is a misnomer for a tendency in the direction which will most interest the general public, and in consequence increase the value of the exhibitions to the profession. These two points of view arise from different conceptions of the functions of the architectural exhibition, and as a matter of fact the architectural exhibition does serve various purposes.

It is, in the first place, a review of current work, in which the architects exhibit with justifiable pride to each other and the general public their latest efforts. Secondly, its purpose is educational in a dual sense, both within the profession and to the laity, and probably the main questions which arise as to the character of exhibits spring from a lack of definite purpose on the parts of the responsible directors as to whether the appeal of the exhibition is to be made to the public or to the profession. The tendency to exhibit photographs in increasing numbers at the expense of space formerly devoted to drawings, both technical and perspective, probably springs as much from a realization that drawings are often incomprehensible to the public, and photographs are the only thing they really understand, as from any other single cause: yet photographs do possess one valuable quality which no drawing can possess—they represent executed work with an approximation to cold fact, and after all it is the executed work which is important, not the processes. If the exhibition is intended to appeal to the draughtsmen and to other architects, an exhibition of processes is, of course, very important, though not in our opinion so important as an exhibition of results, for one can imagine very poor results from excellent processes, and good results from poor processes. Unquestionably, the working drawings which are being made today are superior in technique to any drawings of the Renaissance or Gothic periods, and yet the executed work of Renaissance and Gothic architects taken

in the mass surpass those of the present time. Certain members of the profession are blind to this; men have ever been heard to say that it was impossible to judge of the excellence of a building without seeing the drawings, a point of view which seems utterly false and completely absurd. It is, however, very difficult to judge of the quality of an executed building from their drawings alone, and especially from perspectives in which beauty of coloring and drawing falsify the scale of detail, hide bad spots in design by opportune trees, thus making a very ugly building into a lovely picture. Of course, such tricks are not impossible with a camera, but are confined to a much more limited extent, and are accompanied with much greater difficulty.

Another apparent reason for the steady increase in the number of photographs is that architectural renderings of the best quality have become so beautiful and so costly, that there are very few men in the country who are capable of making drawings which will stand up against those made by men who specialize in rendering, and no one wants to spend the very great amount of time and labor which a perspective drawing entails, to have it rejected by the committee because of inferior rendering, or to have it accepted by the committee and appear at a disadvantage when seen beside the work of specialists.

Photographs represent the work of men much more on the dead level, and give almost everybody an opportunity to have their work judged not on false presentation, but on actual merit, and photographs most likely will continue as a very important medium of expression. An especial criticism has been made in regard to plans; the number of plans exhibited has been by no means commensurate with the number of buildings otherwise shown, and very many people feel that no exterior can be comprehended unless the plan accompanies it. This is in most cases true, and it is to be hoped that the annual exhibitions will include a larger number of plans hung in close relationship to the photographs or drawings which they accompany, and presented in a suitable way.

The experience of ARCHITECTURE has been that its readers demand plans of all work which is the least unusual in character, but the exhibition committees have not apparently found this demand so urgent.

We likewise believe that the primary appeal of the exhibition should be made to the general public, and not to the architectural profession. The architects are pretty fully informed of the progress of work through the architectural magazines, whose circulation is unfortunately limited to the profession and to a very few intelligent men outside of it, but the general public does attend the exhibitions in great numbers, and their interest in architecture must be held before their knowledge of architecture can be increased, or their desire for better architecture stimulated.

AN enterprise unique in character and of more than passing interest to architects has been launched.

The National Hospital Bureau, 8 West 40th Street, New York, recently incorporated to broaden and perpetuate the work of M. E. McCalmont and associates as specialists in organizing, equipping and administration of hospitals, enters a field of unusual scope. The bureau's activities extend beyond the services indicated. It aims to establish a center of information and education where hospital trustees and staffs, architects, manufacturers and all interested in the building of efficient medical institutions may learn of their technical requirements. Classes and lectures on hospital organization and management will be arranged by the bureau.

The laying out or revision of hospital plans, based on practical and technical knowledge, as consultants in co-operation with architects will also be included in its scope.

The bureau maintains a permanent model hospital and during the month of May it will formally open its exhibit and conduct a series of receptions to hospital boards, medical societies, hospital superintendents and others interested in hospital work.

Architects find it difficult at times to secure information on the particular needs of hospitals from the combined standpoint of superintendent, worker, physician and patient and the services of the bureau along these lines will no doubt be of value to many in the profession.

The exhibitors have shown a most commendable appreciation of decorative values and have demonstrated that hospitals can be made beautiful and comfortable as well as sanitary.

The exhibit is full of the most valuable suggestions to those who have to do with the practical end of a hospital.

Tuesday and Wednesday, May 23rd and 24th, are set aside especially for architects.

The editor is pleased to call attention to these receptions because in the exhibit the architect and builder will find concrete illustrations of the technical details of the services that a modern and efficient hospital should render.

THE Society for Electrical Development wishes to obtain a poster design to be used in the national electrical celebration to be known as America's Electrical Week, December 2nd to 9th, 1916.

The competition is open to all residents of the Americas, the latitude of eligibility being in accordance with the scope of the celebration. The competition shall begin April 1st and close June 1, 1916.

The committee wants a poster which will symbolize or portray electricity as the greatest factor in modern civilization. The committee wishes the artist to have the widest range in his conception and, hence, imposes no limitations upon his creative skill. Artists should bear in mind that electricity has three distinctive influences—light, heat and power—all of which are essential elements in social and industrial progress. Broadly speaking, the committee desires a poster which clearly and forcibly stands for electricity, the unseen force at the service of nations as well as of men. The committee particularly asks the artists to eliminate the suggestion of lightning. The artist must inscribe within his design, in whatever form or arrangement he may deem most appropriate to his subject, the words: America's Electrical Week, December 2 to 9, 1916, "Do It Electrically."

There will be $2,200 in prizes, the Grand Prize being $1,000. There will be a Second Prize of $500; a Public Choice Prize of $300; an Art Students' Prize of $200, and $200 in School Prizes.

The judges are: Mr. John Quincy Adams, Secretary, Art Commission of the City of New York; Dr. James P. Haney, Director of Art in New York High Schools; Mr. Herbert S. Houston, President, Associated Advertising Clubs of the World; Mr. Arthur F. Wiener, President, International Art Service; Mr. P. L. Thomson, Advertising Manager, Western Electric Company; Mr. Henry L. Doherty, President, The Society for Electrical Development, Inc.

The judges will determine the winners of the Grand and Second Prizes, the Art Students' Prize and the School Prizes.

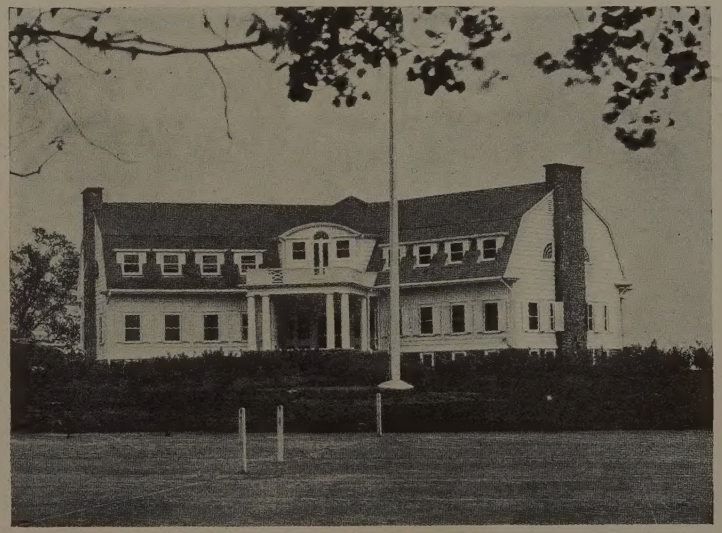
The Public Choice Prize will be determined by the highest total vote registered at exhibitions to be held in New York, Chicago, Pittsburgh, and Boston, in favor of any of the designs deemed suitable for these exhibits by the judges.

All designs submitted in competition should be sent before June 1st, to the Poster Committee, The Society for Electrical Development, Inc., 29 West 39th Street, New York.

American Architect.

House, J. A. McElroy, So. Orange, N. J. Davis, McGrath & Kiessling, Architects.

American Architect.



Country Club, Glen Ridge, N. J. Davis, McGrath & Kiessling, Architects.

Western Architect.

Detail, American Theatre, Chicago. H. H. Mahler, Architect.

American Architect.

The Lounge, Country Club, Glen Ridge, N. J. Davis, McGrath & Kiessling, Architects.